Title· . . . PROVIDING INSTRUMENTATION DATA TO AN
INSTRUMENTATION DATA SOURCE FROM WITHIN A
MANAGED CODE ENVIRONMENT
Inventors: T.J. Muhlestein et al.
Docket No: MSFT116344

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REMOVABLE MEDIA 14

NON-REMOVABLE MEDIA 16

OUTPUT DEVICE(S) 20

INPUT DEVICE(S) 18

COMMUNICATION CONNECTION 22

INTERNET 4

SYSTEM MEMORY 8

VOLATILE 10

NON-VOLATILE 12

PROCESSING UNIT 6

2

Fig.1

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MANAGED CODE
ENVIRONMENT

WIN FORMS

ASP.NET

WEB FORMS | WEB
SERVICES

SERVICES FRAMEWORK

BASE
CLASS LIBRARY | DATA ACCESS
CLASS LIBRARY | DEBUGGING
CLASS
LIBRARY | OTHER
CLASS
LIBRARIES

COMMON LANGUAGE RUNTIME

SYSTEM SERVICES

Fig.2

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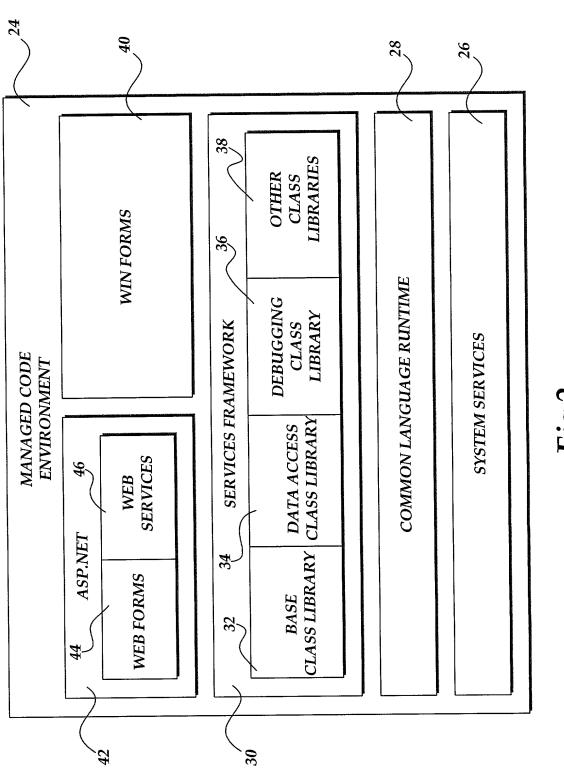Docket No: MSFT116344

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Fig.3

WINMGMT 48

CIM OBJECT REPOSITORY 50

CIM OBJECT MANAGER ("CIMOM") 52

MANAGEMENT CONSOLE 60

SNAP-IN 62N

SNAP-IN 62A

MANAGEMENT APPLICATION 58

DATA PROVIDER 54N

OTHER OBJECT 56N

DATA PROVIDER 54D

WIN32 OBJECT 56D

DATA PROVIDER 54C

DMI OBJECT 56C

DATA PROVIDER 54B

SNMP OBJECT 56B

DATA PROVIDER 54A

WDM KERNEL OBJECT 56A

Title: . . . PROVIDING INSTRUMENTATION DATA TO AN
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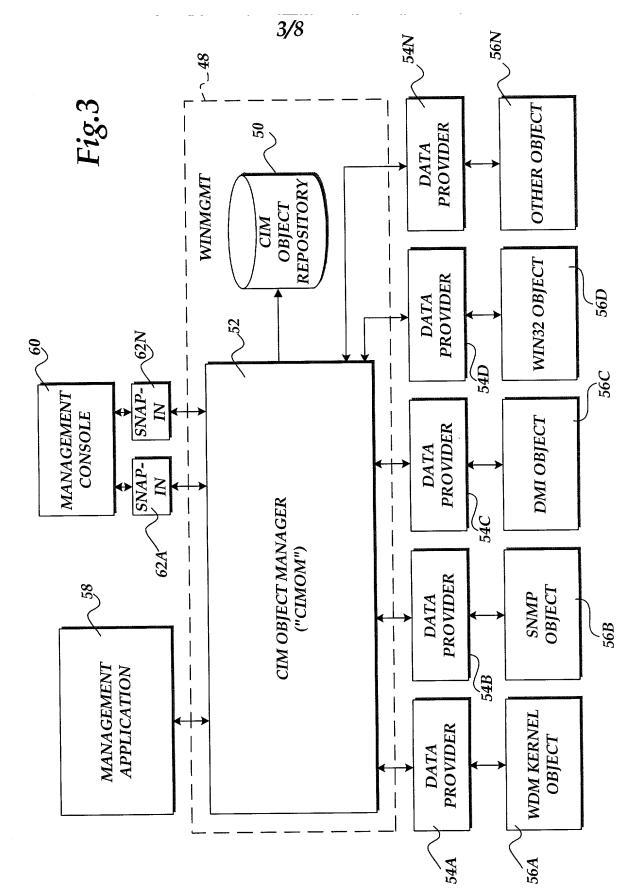Inventors: T.J. Muhlestein et al.
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Fig.4

24

MANAGED CODE
ENVIRONMENT

NATIVE CODE
ENVIRONMENT

PROCESS
BOUNDARY

CIM
OBJECT
REPOSITORY   50

52

CIMOM

MANAGED
CODE APPLICATION   64

MANAGED PROVIDER   66

DECOUPLED
PROVIDER   68

DECOUPLED
PROXY   70

MANAGEMENT
APPLICATION   58

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EXPOSE OBJECTS TO
INSTRUMENTATION
DATA SOURCE — 500

502 — RECEIVE INDICATION THAT OBJECTS
SHOULD BE AVAILABLE TO
INSTRUMENTATION DATA SOURCE

504 — DECOUPLED PROVIDER PRESENT?

NO

LOAD
DECOUPLED
PROVIDER
506

YES

508 — CLASS PREVIOUSLY REGISTERED?   YES

NO

510 — REGISTERED CLASS CORRECT?   YES

NO

514 — REGISTER CLASS WITH
INSTRUMENTATION DATA SOURCE

OVERWRITE
REGISTERED CLASS
WITH CORRECT
PROPERTIES
512

516 — REGISTER MANAGED CODE
APPLICATION AS A PROVIDER OF
INSTANCES OF THE CLASS TYPE

518 — NOTIFY DECOUPLED PROVIDER
THAT INSTANCES OF THE OBJECT ARE
AVAILABLE TO BE INSTRUMENTED

520 — END

Fig.5

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Inventors: T.J Muhlestein et al
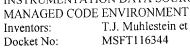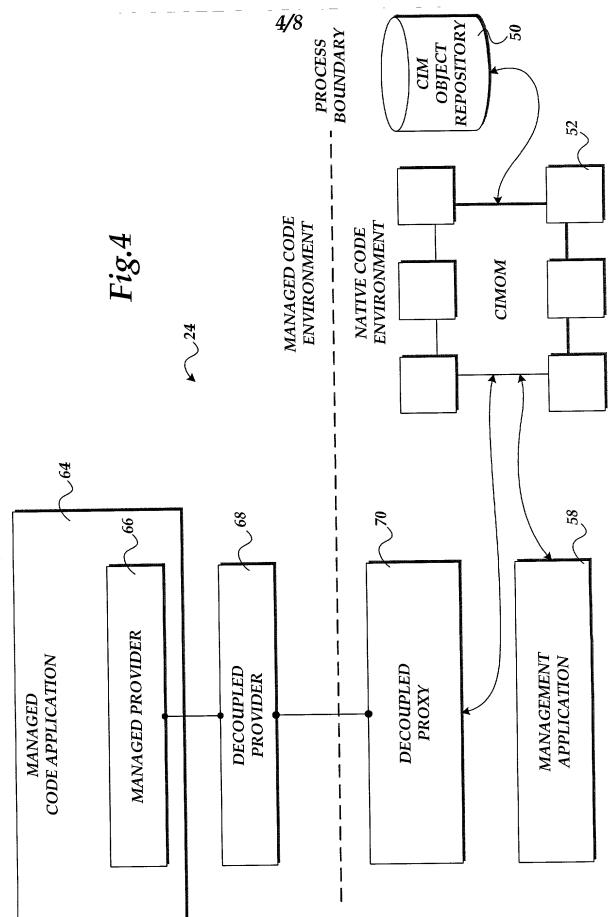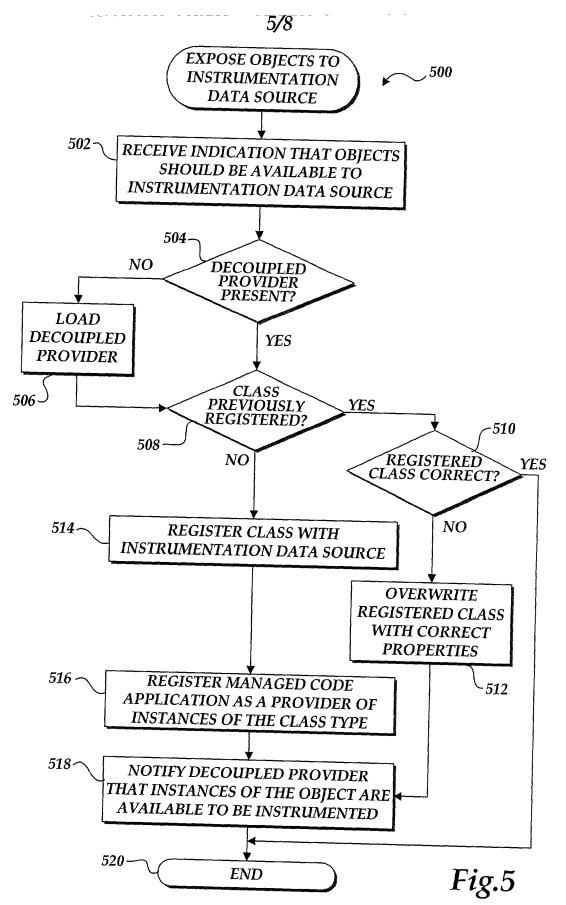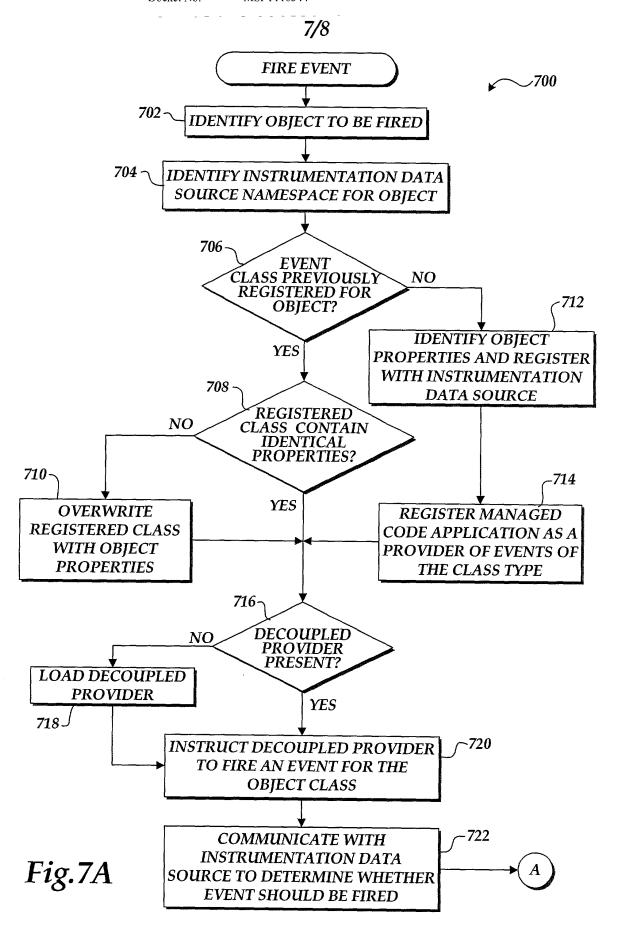Docket No   MSFT116344

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```
                          ( PROCESS REQUESTS FOR OBJECT )
                          (  DATA AND INVOKING METHODS  )
          600                            │
                                         ▼
   602 ──────┐           ┌─────────────────────────────────┐
             │           │    RECEIVE REQUEST FROM         │
             ├──────────►│ INSTRUMENTATION DATA SOURCE     │◄──────┐
             │           │    AT DECOUPLED PROVIDER         │       │
             │           └─────────────────────────────────┘       │
             │                           │                         │
             │              ┌─606        ▼          ┌─604           │
   ┌──────────────────┐     YES    ╱─────────────╲                 │
   │ QUERY PROVIDERS FOR │◄─────────  REQUEST FOR  ╲                │
   │ INSTANCES THAT MEET │          ╲   INSTANCE?  ╱                │
   │ CRITERIA PROVIDED   │           ╲────────────╱                 │
   │   WITH REQUEST      │                 │ NO                     │
   └──────────────────┘                   ▼                        │
             │                   ┌─614                             │
             ▼ ┌─608    ╱──────────────────────╲           NO      │
   ┌──────────────────┐ ╱  REQUEST                ╲ ───────────────►│
   │ IDENTIFY INSTANCES │  TO EXECUTE METHOD OR   ╱                 │
   │ THAT MEET CRITERIA │ ╲   WRITE PROPERTY?    ╱                  │
   └──────────────────┘   ╲──────────────────╱                     │
             │                      │ YES                          │
             ▼ ┌─610               ▼                               │
   ┌──────────────────┐   ┌──────────────────┐  ┌─616              │
   │ CONVERT INSTANCES TO A│   IDENTIFY       │                    │
   │ FORMAT COMPATIBLE WITH│ REQUESTED OBJECT │                    │
   │ THE INSTRUMENTATION   └──────────────────┘                    │
   │   DATA SOURCE      │           │                              │
   └──────────────────┘            ▼                               │
             │ ┌─612     ┌──────────────────┐  ┌─618               │
             ▼           │ CALL METHOD OR   │                      │
   ┌──────────────────┐  │ WRITE PROPERTY ON│                      │
   │ RETURN INSTANCES TO│ │ REQUESTED OBJECT │                     │
   │ INSTRUMENTATION    │ └──────────────────┘                     │
   │   DATA SOURCE      │          │                               │
   └──────────────────┘           ▼                                │
             │           ┌──────────────────┐                      │
             │           │ PROVIDE CONFIRMATION│                   │
             └──────────►│ TO INSTRUMENTATION │────────────────────┘
                         │   DATA SOURCE      │
                         └──────────────────┘
                                          └─620
```

Fig.6

FIRE EVENT

700

702 — IDENTIFY OBJECT TO BE FIRED

704 — IDENTIFY INSTRUMENTATION DATA SOURCE NAMESPACE FOR OBJECT

706 — EVENT CLASS PREVIOUSLY REGISTERED FOR OBJECT?

NO

712

IDENTIFY OBJECT PROPERTIES AND REGISTER WITH INSTRUMENTATION DATA SOURCE

YES

708 — REGISTERED CLASS CONTAIN IDENTICAL PROPERTIES?

NO

710 — OVERWRITE REGISTERED CLASS WITH OBJECT PROPERTIES

YES

714

REGISTER MANAGED CODE APPLICATION AS A PROVIDER OF EVENTS OF THE CLASS TYPE

716 — DECOUPLED PROVIDER PRESENT?

NO

LOAD DECOUPLED PROVIDER

718

YES

INSTRUCT DECOUPLED PROVIDER TO FIRE AN EVENT FOR THE OBJECT CLASS — 720

COMMUNICATE WITH INSTRUMENTATION DATA SOURCE TO DETERMINE WHETHER EVENT SHOULD BE FIRED — 722

A

Fig.7A

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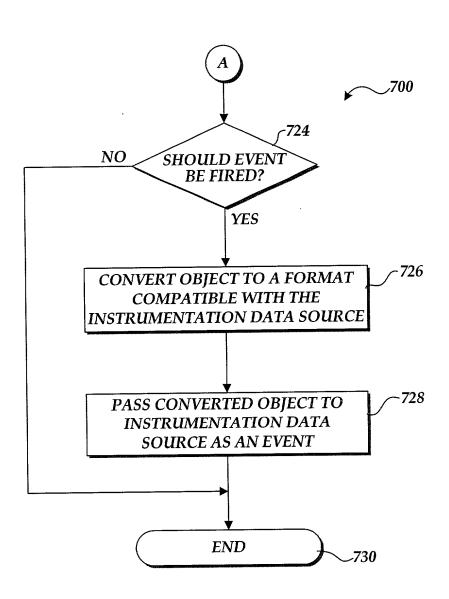Docket No: MSFT116344

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(A)

↙ 700

NO ← SHOULD EVENT BE FIRED? ⟋724

YES

CONVERT OBJECT TO A FORMAT COMPATIBLE WITH THE INSTRUMENTATION DATA SOURCE ⟋726

PASS CONVERTED OBJECT TO INSTRUMENTATION DATA SOURCE AS AN EVENT ⟋728

END ⟍730

Fig.7B